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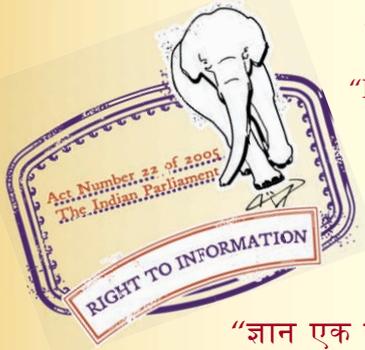
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IS 11659 (1986): Rubber Hose for Transferring Anhydrous Ammonia [PCD 13: Rubber and Rubber Products]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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Indian Standard
SPECIFICATION FOR
RUBBER HOSE FOR TRANSFERRING
ANHYDROUS AMMONIA

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
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Indian Standard

SPECIFICATION FOR RUBBER HOSE FOR TRANSFERRING ANHYDROUS AMMONIA

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Indian Standard

SPECIFICATION FOR RUBBER HOSE FOR TRANSFERRING ANHYDROUS AMMONIA

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 13 May 1986, after the draft finalized by the Rubber Products Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

0.2 Rubber hoses are used for transferring ammonia in liquid or gaseous form to or from pressure tanks or refrigerated tanks.

0.3 In the preparation of this standard, considerable assistance has been derived from ISO 5771 Rubber hose and hose assemblies for transferring anhydrous ammonia issued by the International Organization for Standardization.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for rubber hoses used for transferring ammonia both in liquid and in assemblies made from these hoses and is suitable for working pressure up to 2.5 Mpa.

1.2 The hoses specified in this standard are not suitable for applications where the hose is downstream from a pressure regulator and is open to the atmosphere at one end.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 7503 (Part 1)-1974† and IS : 443-1975‡ shall apply.

*Rules for rounding off numerical values (*revised*).

†Glossary of terms used in rubber industry: Part 1.

‡Methods of sampling and test for rubber hoses (*second revision*).

3. REQUIREMENTS

3.1 Materials

3.1.1 Lining — The lining shall consist of a suitable rubber compound resistant to hardening or other deterioration due to the action of ammonia. It shall be seamless, reasonably smooth in bore, uniform in thickness and free from air blisters, porosity and splits.

3.1.2 Reinforcement — The reinforcement shall consist of natural or synthetic fibre or combination thereof not adversely affected by permeating ammonia. If braided the same shall be done evenly over the lining and impregnated with a suitable rubber compound.

3.1.3 Cover — The cover shall consist of a suitable rubber compound resistant to the action of ammonia and resistant to abrasion and weathering. It shall be seamless, reasonably smooth, in bore, uniform in thickness and free from air blisters, porosity and splits. The cover may have smooth or cloth-marked finish and the whole shall be consolidated by wrapping and uniformly vulcanized to give good adhesion between the reinforcement plies and the rubber lining of the cover. A gas-tight cover shall be pricked during manufacture to permit the release of any permeating gas in service. The pricking shall not penetrate beyond the thickness of the cover.

3.2 Dimensions and Tolerances

3.2.1 Bore Size — The nominal bore size and tolerance of the hose when measured according to the method prescribed in 4.2.1 of IS : 443-1975* shall be as given in Table 1.

TABLE 1 NOMINAL BORE SIZES AND TOLERANCE ON BORE SIZES

Sl. No.	NOMINAL BORE (mm)	TOLERANCE ON NOMINAL BORE (mm)
(1)	(2)	(3)
i)	12.5	± 0.75
ii)	20	± 0.75
iii)	25	± 1.25
iv)	31.5	± 1.25
v)	38	± 1.50
vi)	50	± 1.50
vii)	63	± 1.50
viii)	75	2.00

*Methods of sampling and test for rubber hoses (*second revision*).

3.2.2 Lining and Cover Thickness — The thickness of lining and cover for all the hoses, when measured according to the method prescribed in 4.2.2 of IS : 443-1975*, shall be not less than 3 mm and 1.5 mm respectively.

3.2.3 Length — The length shall be as specified by the purchaser and shall have a tolerance of ± 1 percent.

3.3 Tensile Strength and Elongation at Break of Lining and Cover — The tensile strength and elongation at break of the rubber used for lining and cover of the hose when tested in accordance with the method prescribed in 5 of IS : 443-1975* shall be as specified below:

Characteristic	Requirement for	
	Lining	Cover
Tensile strength, MPa, <i>Min</i>	9.0	8.0
Elongation at break, percent, <i>Min</i>	200	300

3.4 Accelerated Ageing Test — After ageing at $100 \pm 1^\circ\text{C}$ for a period of 72 hours in accordance with the method prescribed in IS : 3400 (Part 4)-1978† the rubber used for the lining and cover of the hose shall not vary by more than ± 25 percent in tensile strength, and $\pm \frac{10}{45}$ percent for elongation at break of the corresponding values obtained before ageing when tested according to the method prescribed in 6 of IS : 443-1975*.

3.5 Adhesion — The adhesion when tested according to the Method A given in IS : 3400 (Part 5)-1983‡ shall be such that the rate of separation does not exceed 25 mm per minute under a load of 5 kg for the following:

- Between braids,
- Between lining and braid, and
- Between cover and braid.

3.6 Low Temperature Flexibility — The lining and cover when tested according to the Method B prescribed in 15 of IS : 443-1975*, shall show no cracking at $-40 \pm 1^\circ\text{C}$.

3.7 Hydrostatic Test Requirements

3.7.1 Proof Test on the Hose Lengths — Each manufactured length of hose, if supplied without couplings, shall be subjected to an internal hydraulic pressure 2 times the designed working pressure applied at a rate of 0.075 to 0.15 MPa per second. The proof pressure shall be

*Methods of sampling and test for rubber hoses (*second revision*).

†Methods of test for vulcanized rubber: Part 4 Accelerated ageing (*first revision*).

‡Methods of test for vulcanized rubber: Part 5 Adhesion of rubbers to textile fabrics (*first revision*).

maintained for 5 min, then reduced at the same rate to 0.35 MPa and shall be maintained for a further period of 2 min. During the test, the hose shall show no signs of leakage.

3.7.1.1 Change in length at proof pressure when tested as specified in 8.4 of IS : 443-1975* shall be $\pm \frac{5}{0}$ percent maximum.

3.7.1.2 The test medium shall be water.

3.8 Bursting Pressure — Representative samples having a minimum length of 63 cm clear of test fittings, cut from hose of approximately 100 cm long, shall be subjected to a hydraulic pressure, built up at a rate of 0.075 to 0.15 MPa per second until the hose bursts. The test medium shall be water and the bursting pressure, when tested according to the method prescribed in 8.2 of IS : 443-1975*, shall not be less than 12.5 MPa.

3.9 Ammonia Resistance Test

3.9.1 Conditioning — Fill a length or lengths of hose with liquid anhydrous ammonia by connection to a tank and flushing out with ammonia to remove all the air. Seal one end of each length and leave the other end connected to the liquid space of a tank of anhydrous ammonia. Condition the hose for 30 days at standard laboratory temperature. Any valve between the ammonia tank and the hose may be closed, provided that it is opened completely at least once each day to fill the hose with liquid anhydrous ammonia. If the hose is closed off by means of stop valves at each end when full of liquid, a hydrostatic relief valve should be provided between the stop valves. Examine the hose each day for visible defects and note any evidence of blistering, cracking or perceptible leakage.

NOTE 1 — The operator in-charge of the installation and inspection shall ensure compliance with all safety precautions concerning the handling of ammonia.

NOTE 2 — The total amount of hose conditioned shall be sufficient to carry out burst and adhesion test.

3.9.2 The conditioned hose when tested as per 3.8 bursting pressure shall not be less than 10 MPa.

3.9.3 The conditioned hose shall pass the adhesion test as per 3.5.

4. MARKING AND PACKING

4.1 Each length of hose shall be indelibly marked at intervals of 5 m with the following information:

- a) The manufacturer's name or trade-mark, if any;
- b) The hose denomination and maximum working pressure;

*Methods of sampling and test for rubber hoses (second revision).

- c) The month and year of manufacture, if required by the purchaser; and
- d) *Cautionary Notice* — Do not use at temperatures and pressures above those recommended in the specifications. Failure in service can result in injury to personnel or damage to property.

4.1.1 Each length of hose may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

4.2 The material shall be packed as agreed to between the purchaser and the supplier.

5. SAMPLING

5.1 For the purpose of ascertaining conformity of the hose in a consignment to this specification, the scale of sampling and the criteria for conformity shall be as prescribed in 3 of IS : 443-1975*.

6. ACCEPTANCE TESTS

6.1 The hose assemblies shall be made from hose lots for which tests on a sample have shown that the bursting limit pressure is at least equal to 12.5 MPa. The test shall be made by the hose manufacturer on an homogenous lot of production according to IS : 443-1975*.

6.2 Before being put in service, each hose assembly shall comply with the hydraulic test at a pressure of at least 5 MPa. The test shall be made by the users of the fittings according to IS : 443-1975* on a hose assembly with its service fittings from a lot received according to 6.1.

6.3 Unless otherwise agreed to between the purchaser and the supplier, all tests shall be carried out within 3 months from the date of receipt of material by the purchaser.

*Methods of sampling and test for rubber hoses (*second revision*).

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